Claims:

1. A catalyst composition for the oxidation of ethane, and optionally ethylene, to acetic acid and ethylene, which catalyst composition comprises (i) a support, and (ii), in combination with oxygen, the elements molybdenum, vanadium and niobium, optionally tungsten and a component Z, which is one or more metals of Group 14 of the Periodic Table of Elements; wherein a, b, c, d and e represent the gram atom ratios of the elements Mo, W, Z, V and Nb respectively, such that :

$0 < a \leq 1$; $0 \leq b < 1$ and $a + b = 1$;

$0.05 < c \leq 2$;

$0 < d \leq 2$; and

$0 < e \leq 1$.

2. A catalyst composition according to claim 1 wherein $0.01 < a \leq 1$, $0.1 \leq c \leq 2$, $0.1 \leq d \leq 2$, $0.01 < e \leq 1$.

3. A catalyst composition according to claim 2 wherein $0.1 \leq d \leq 0.5$.

4. A catalyst composition according to claim 2 or claim 3 wherein $0.01 \leq e \leq 0.6$.

5. A catalyst composition according to any one of the preceding claims wherein Z is Sn.

6. A catalyst composition according to any one of the preceding claims wherein the catalyst composition comprises a further component, Y, which is one or more elements selected from the group consisting of: Cr, Mn, Ta, B, Al, Ga, In, Pt, Zn, Cd, Bi, Ce, Co, Rh, Ir, Cu, Ag, Fe, Ru, Os, K, Rb, Cs, Mg, Ca, Sr, Ba, Ni, P, Sb, Si, Tl, U, Re, Te, La, Au, Ti, Hf, Zr and Pd.

7. A catalyst composition according to claim 6 wherein Y is selected from the

group consisting of Bi, Ca, Ce, Cu, K, P, Sb, La, Hf, Zr, Ti and Te.

8. A catalyst composition according to claim 7 wherein Y is selected from Hf, Ti and Zr.

9. A catalyst composition according to claim 8 wherein Y is Ti.

10. A catalyst composition according to claim 1 which comprises Sn and further comprises, as component Y, Ti.

11. A catalyst composition according to any one of claims 7 to 10 wherein Y is present at a gram atom ratio, f, wherein $0 \leq f \leq 2$.

12. A catalyst composition according to claim 10 wherein $0.01 \leq f \leq 0.5$.

13. A catalyst composition according to any one of the preceding claims which catalyst composition is substantially devoid of gold and/or palladium.

14. A catalyst composition according to any one of claims 1 to 13 wherein the support comprises at least one metal oxide support.

15. A catalyst composition according to claim 14 wherein the metal oxide support is selected from silica, titania, titanosilicates, alumina, aluminosilicates, zirconia and mixtures thereof.

16. A catalyst composition according to claim 15 wherein the metal oxide support is selected from silica, titania and a mixture of silica and titania.

17. A catalyst composition according to any one claims 1 to 13 wherein the support is a non-oxide support.

18. A catalyst composition according to any one of the preceding claims in which the support comprises from about 20 wt% to 90 wt% of the total weight of the catalyst composition.

19. A catalyst composition according to claim 18 wherein the support comprises from 40 wt% to 60 wt% of the total weight of the catalyst composition.

20. A catalyst composition according to any one of the preceding claims in which at least one of aluminium, titanium and zirconium is present in the composition as a component of the support and/or as component Y.

21. A process for the preparation of a catalyst composition according to any one of the preceding claims which process comprises the steps of:

(a) forming a mixture comprising molybdenum, vanadium, niobium, a support material or a precursor thereof, component Z, and optionally tungsten in a solution;

(b) drying the mixture to form a dried solid material; and

(c) calcining the dried solid material to form the catalyst composition.

22. A process according to claim 19 in which step (a) further comprises a component Y as defined in any one of claims 6 to 9.

23. A process according to claim 21 wherein the mixture is formed as a solution in water.

24. A process according to claim 23 wherein the solution has a pH of 2 to 8.

25. A process according to any one of claims 21 to 24 wherein in step (a) the support material or precursor thereof is added to a pre-formed mixture of molybdenum, vanadium, niobium, component Z, optional tungsten and optional component Y.

26. A process according to any one of claims 21 to 25 wherein the drying process of step (b) is a spray-drying process.

27. A process according to any one of claims 21 to 26 wherein the calcining is carried out by heating the dried solid material to a temperature of 200 to 550° C in air or oxygen for 1 minute to 24 hours.

28. A process for the production of acetic acid and ethylene from a gaseous mixture comprising ethane, and optionally ethylene, which process comprises contacting in a reaction zone the gaseous mixture with a molecular oxygen-containing gas at elevated temperature in the presence of a catalyst composition as claimed in any one of claims 1 to 20 or as prepared by any one of claims 21 to 27.

29. A process according to claim 28 wherein the gaseous mixture comprises ethane and ethylene.

30. A process according to claim 28 or claim 29 in which water is also present as a feed component.

31. A process according to any one of claims 28 to 30 wherein acetic acid and ethylene are produced in a ratio in the range 0.8 :1 to 1.2 : 1.

32. A process according to claim 31 wherein the ratio of acetic acid to ethylene is in the range 0.9 : 1 to 1.1 : 1.

33. A process according to any one of claims 28 to 32 wherein the elevated temperature is in the range 200 to 500° C

34. A process according to any one of claims 28 to 33 wherein the process is carried out at a pressure in the range of 1 to 50 bar

35. A process according to any one of claims 28 to 34 wherein the catalyst is used in the form of a fixed bed or a fluidised bed.

36. A process according to any one of claims 28 to 35 wherein the overall selectivity to acetic acid and ethylene is at least 70 mol%.

37. A process according to claim 36 wherein the overall selectivity is at least 75 mol%.

38. A process as claimed in any one of claims 28 to 37 in which at least a portion of the acetic acid and at least a portion of the ethylene is contacted in a second reaction zone with a molecular oxygen-containing gas at elevated temperature in the presence of a catalyst suitable for the production of vinyl acetate to produce vinyl acetate.

39. A process as claimed in claim 28 in which acetic acid and ethylene are produced in a ratio in the range 0.8 :1 to 1.2 : 1 and which are contacted in a second reaction zone with a molecular oxygen-containing gas at elevated temperature in the presence of a catalyst suitable for the production of vinyl acetate to produce vinyl acetate.

40. A process according to claim 38 or claim 39 wherein the second reaction zone is a fluidised bed reactor.

41. A process as claimed in any one of claims 28 to 37 in which at least a portion of the acetic acid and at least a portion of the ethylene is contacted in a second reaction zone with a molecular oxygen-containing gas at elevated temperature in the presence of a catalyst suitable for the production of ethyl acetate to produce ethyl acetate.

42. A process as claimed in claim 28 in which acetic acid and ethylene are produced in a ratio in the range 0.8 :1 to 1.2 : 1 and which are contacted in a second reaction zone with a molecular oxygen-containing gas at elevated temperature in the presence of a catalyst suitable for the production of ethyl acetate to produce ethyl acetate.